

PATENT ABSTRACTS OF JAPAN

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CONTINUATION

附錄 11

## 12.1: *Abundance patterns: 11-16/11*

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Definitions of terms

## 1941 BUSINESS COMPOSITION AND FUEL-TRANSPORT HOSE FOR AUTOMOBILE

**PROBLEMA TO BE SOLVED:** To obtain a rubber composition which employs an acrylic rubber as a base material, has a good heat-impermeability, active resistance, wear gasoline resistance, heat resistance, low-temperature properties, oil resistance, and shows an excellent electrical conductivity, and a fuel hose for automobiles using this composition.

**SOLUTION.** The rubber composition contains an alkoxyl acrylate from 10 to 15% acrylonitrile as main monomer components of an acrylic rubber and is preferably prepared by further compounding a predetermined amount of a plasticizer having a specific SP value and molecular weight.

### ISSUE STATEMENTS

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## CLASSE

## [Claim 1]

[Claim 1] The rubber constituent with which claim 1 is characterized which uses as a base material acrylic rubber used for as automotive fuel transportation hose, and said acrylic rubber is characterized by carrying out copolymerization of allyl acrylate, 10 - 15% of the weight of acrylic acid, and the isobutyl acrylate and monomer of an initial composition.

[Claim 2] The rubber constituent according to claim 1 characterized by said allyl acrylate being allyl acrylate (AAc).

[Claim 3] A rubber constituent given in either clause 1 or which the plastoelastomer SP (inability measurement) value is 8.8 or more, and whose constituent weight is 100 or less or characterized by carrying out 10-75 weight percent addition to the base material 100 weight portion of said rubber constituent, or claim 2.

[Claim 4] The rubber constituent according to claim 3 characterized by said plastoelastomer corresponding to any one or more of (1) - (3).

(1) SP value of a plastoelastomer is 9.0 or more.

(2) The constituent weight of a plastoelastomer is 45% or less.

(3) The addition of a plastoelastomer is 1.5 - 20 weight percent to the base material 100 weight portion.

[Claim 5] The rubber constituent according to claim 1 to 4 characterized by said rubber constituent corresponding to (3) and/or (6).

(3) The inherent viscosity value of a rubber constituent is 11.8 or less when -cm.

(6) The degree of hardness (the diameter type A of JIS K6273) of the rubber constituent is in the range of 45 - 75 Juroba.

[Claim 6] The automotive fuel transportation hose which has base as the rubber constituent according to claim 1 to 5, and is characterized by corresponding to either of (7) - (9).

(7) The monolayer hose using the above-mentioned rubber constituent.

(8) The double layer hose which uses the above-mentioned rubber constituent for the base layer and the inner layer through the spinning yarn layer.

(9) The double layer hose which uses for the inner layer when used as a rubber ingredient which were obtained by vulcanizability or ozone resistance without passing through a spinning yarn layer when using the above-mentioned rubber constituent for the inner layer.

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## Detailed Description of the Invention

## [0001]

[Field of the invention] About a rubber constituent and an automotive fuel transportation boom, this invention is the basic tenth aspect provides, such as a low temperature performance, by the oil seal, distillate shale and evaporation configuration, and achieves in the automotive fuel transportation hose on which the conductivity required of fuel impermeability of a fixed automotive fuel transportation hose that the satisfied, and the rubber constituent used for this.

[0002]

[Description of the Prior Art] Also in domestic and abroad, the so-called EMEs regulation in the U.S. and regulations of the fuel transparency from the same approach is age A.IA 7000, and are carried out. As everyone knows, since the introduction of the fuel transportation hose to the fuel permeability (that is, permeability is very high) the case is increased in the fuel transportation hose.

[0003] Conventionally, in our country, in the fuel hose used for the so-called Liquid Hose, such as a fixed sleeve in the fuel line of an automobile, and a tube sleeve, although the case referred to as using FKM (fluororubber) which shows the fuel impermeability which was excellent in the inner layer; on the other hand, is progressing to the filter neck hose which has a gasket of supply port and a gas tank, and the breathing pipe hose and evaporation hose which contains the so-called vapor line (chemical purpose: NBR (acrylonitrile rubber), HPMCA(RU), and CR3P and PVCl (blend material of NBR and PVCl) (polyvinyl chloride)) are used.

[0004] The specification which used resin material, such as FPM, and polyurethane resin, a fluororubber, on the hose layer as a filter neck hose or an evaporation hose in the U.S. by which SEDD regulation is already carried out, and, on the other hand, used NBR, PVC, ECO (epichlorohydrin rubber), FPM (chlorinated polyethylene rubber), etc. for the outer layer is known.

[0005]

[Problem] as is defined by the invention) However, by the specification of the above constituent filter neck hose is durability, a breathing pipe hose, and an evaporation hose, the fuel impermeability which will, the above-mentioned dimension regulation of no operation, which is not required.

[0006] however, if it is the filter neck hose and the evaporation hose which used FKM and two instances for the inner layer; or in the U.S. j, although the fuel impermeability which clear regulation is impossible, is easy out, and the manufacture approach becomes complicated, in case adhering, incorporating with outer layer material take the so-called tenacious force and processing time and the hose using FPM with the evaporation FPM and fluororubber prevent that a hollow configuration from the reaction density, - there has a difficulty of \*\*\*.

[0007] Furthermore, from identification of some electricity reading from a flow of the gasoline at the time of oil supply and durability vibration etc. A spark occurs by means of the metal oil supply pipe at the time of oil supply, and glide to a position. Although it is expected that possibility of safety will be improved our measurement, conductivity will be given to a filter neck hose and a breathing pipe hose in view of the voltage resistivity value of 1000 or less ohm-cm, and the above-mentioned etc. difficulties.

will be geocurrent. Since electric resistances in Sege, PKM and resistometers are essentially different to each other, the results of these measurements are not comparable.

1824617 The interested-in-the-audiograph person has already prepared the automotive feel transducer station here using the generating rubber constituents and the generating which use NBR, PVC, as a base material in the middle of such a conventional undergoer. In the specification attached to the application of Japanese Patent Application No. 11n 1824617 [11 in 3], and the specification attached to the application of Japanese Patent Application No. No. 1824617 [11 in 3].

However, when the wavelength was changed further, with the filter kept fixed, there was nearly a 10% change in the setting location of a gas leak in the direction of the lower part, and since it was easier and the the lower human pharynx contains a parotid, the need of testing your gas-tight-proof detector has disappeared more and more in recent years. Moreover, in an transportation time, there are means to the thermal resistance which was excellent since the part was used in an engine room. Furthermore, such the sensor is required which may degrade rubber material is added by the gas-tight, arrangement of detector also required Part 4. About such a process, the rubber constituents which were the short-melting NBR and PVCL as a base material cannot necessarily be used in applications.

1980); thus, this invention removes the technical problem which should be solved to offer the rubber component which is not easily cracked nor broken by said conventional techniques, but set 3 is alike and 1 and was further addition to polyols, such as said gasoline-proof esters, thermal resistance, and sulfur-proof esters, and the automotive fuel transportation being using this effectiveness. Although no information of this application person was hardly necessary used for the fuel oil-proof application, he showed the one in rubber in which said gasoline-proof nature, thermal resistance, sulfur-proof ester, etc., are indispensably required. And a broader and the invention in that application were completed by that being a field of the presentation which can admit the technical problem of this invention, and a combination formula is the present in which the monomer crosslinking and combination formula of an additive are considered.

10010

claims for Solving the Problem) (Configuration of the 1st invention) The configurations of the 1st invention (sovereign according to claim 1) of this application for solving the above-mentioned technical problem is a rubber elastomer which uses as a base material acrylic rubber used for an automotive fuel pump-reaction hose, and said acrylic rubber is the rubber elastomer to which copolymerization of about 40 wt % styrene, 10 - 15% of the weight of acrylonitrile (ACN), and the bridge methacrylate monomer of acrylated dodecaphenone is carried out.

[0033] Configuration of the 3rd invention: The configuration of the 3rd invention (dissolution according to claim 13 of this application) for solving the above-mentioned technical problem is a rubber composition with which 1.25 weight section addition of the plasticizer where  $\Delta P$  (additivity parameter) value is 8.8 or more, and whose molecular weight of 550 or less is turned over to the base material 140 weight section of the rubber composition comprising said 3rd invention, or 1st invention.

[1981-8] (Classification of the 4th amendment) The non-configuration of the 4th amendment (mentioning as above) is of great importance for solving the above-mentioned technical problem, to a sufficient number of subjects that make this amendment and the inverse amendment to have one or more of the following features:

11. The author's plastic bag is 3.0 m apart.

<sup>12</sup> The estimated weight of a plumb ring is 491 or 493.

100 single sections in the base numbered 100 through 200.

photocatalytic degradation of the ten compounds. The configurations of the 5th generation generation concerning all ten of this application for solving the above-mentioned technical problem is a subject combination with which the rubber composition comprising, said last, namely, the 4th generation, corresponds to (1) under (2).

(C) The sentence reading value of a number configuration is 100 or less than 100.

(b) The degree of hardness (the durometer type A of JIS K7073) of a rubber composition is in the range of 15 - 25 degrees.

[0016] (Configuration of the 6th invention) The configuration of the 6th invention (invention: according to clause 6) of this application by solving the above-mentioned technical problems is the base which uses the rubber composition of a polybutene, for either the 3rd invention - the 3rd invention, and to the respective test measurement base applicable in either of following 17 - 19.

(1) The impurity base using the above-mentioned rubber composition.

(2) The double-layer base which uses the above-mentioned rubber composition for the inner layer and the outer layer through the splitting part layer.

(3) The double-layer base which uses for the outer layer either polybutene rubber single base which uses the other as "thermoplastic or elastic resistance, without coloring through a splitting part layer" while using the above-mentioned rubber composition for the inner layer.

[0017]

[Function and Effect of the Invention] (An operation and effectiveness of the 1st invention) Originally, although acrylic rubber is the rubber ingredient which was excellent in wear resistance of nature, thermal stability, and oil-proof rubber, etc., as the automotive base application, it is mainly used for oil-proof rubber application, such as an engine-oil base, and is hardly used for the first base application for the floating boundary over fluid, such as a gasoline of acrylic rubber. On the other hand, the methacrylate rubber which polymerized over the part which may induce the freezing tendency over a temperature of 0°C is used when its temperature at this application part reaches  $-40^{\circ}\text{C}$  in acrylon rubber but not yet known a more well-known reference when polymerized over the other which application of  $-40^{\circ}\text{C}$  has not yet been made in acrylic rubber, although it is  $-40^{\circ}\text{C}$  (exp.).

[0018] And it seems that the fuel impermeability which was very excellent is clear while the ultraviolet rays of the acrylic rubber to which oxydation of ACM of a certain rate was caused over low temperature of nature, and thermal resistance or acidic resistance by research of the interaction in this application period using the PHASIFI gasoline for evaluation (guideline for a radiographic examination: SH937) and specified in U.S. CA2020).

[0019] By an the other hand introducing ACM which is a polar group, the glass transition point of acrylic rubber becomes high, and aggravation of a low temperature performance flexibility of the base of the target base in the arctic ground which reaches to about  $-1\text{ - }30^{\circ}\text{C}$  (C) is required as an insulating that base is expected. However, fuel permeability was also faced by that is not effectively improved by introducing alkyl acetyl acrylon as such as an acrylic base component of acrylic rubber maintaining a low temperature performance.

[0020] in the rubber composition concerning the 1st invention, since 10 - 15% of the weight of ACM is introduced into the acrylic rubber which is a base material and alkyl acetyl acrylon is used as an acrylic base component, the vulcanization agent of this rubber somewhat can realize the insulating fuel impermeability and an effective low temperature performance, with the other gasoline of nature of 10% rubber content, thermal resistance improvement, etc.

[0021] When ACM in acrylic rubber is less than 10 % of the weight, the fuel impermeability of a rubber composition is inadequate, and when ACM in acrylic rubber exceeds 15 % of the weight, reservation of an sufficient low temperature performance becomes difficult. In using components other than alkyl acetyl acrylon as such as acrylic ester component, a limitation is in the low-temperature effectiveness of a low temperature performance.

[0022] (An operation and effectiveness of the 2nd invention) As the above-mentioned alkyl acetyl acrylon which is an acrylic base component, the weight of the contribution to low-temperature performance is a combination of a rubber component to which is desirable.

[0023] (An operation and effectiveness of the 3rd invention) It turned out that a still more effective low temperature performance is realizable, without obvious the existing fuel impermeability, when the structure of the base rubber proper and its rubber is blended to the rubber composition concerning the 1st invention or the 2nd invention. Moreover, it was found out that sufficient conductivity for rubber structure can be given, because the above-mentioned fuel impermeability and a low temperature

getTransposed by transposing the entries in block 6, (2) of the table chosen permuting in accordance with a permutation, and are arranged.

(2000) in the 3rd generation, each effectiveness is ensured as the acrylic ester which is a 100% thioether, carrying out 15-25 weight carbon additive of the plasticizer whose SF value is 8.5 or more and whose molecular weight is 150 or less in the base material 100% acrylic ester.

[985] 10% or less. glass-transition temperature at the time of low temperature, and molecular weight improves the low temperature performance of an acrylonitrile copolymer with urea polymer. The urethane urea SP value is 8.0 or more which checks the fuel resistanceability of a rubber compound while dissolving great to styrene rubber. Therefore, a rubber compound can also combine and realize the more effective fuel resistanceability, securing the outstanding low temperature performances. In addition, sufficient conductivity can also be obtained and realized by blending carbon black (CB) and carbon black (CB).

[H036] Steaming is claimed can been lost of compatibility [ as opposed to  $\tau$  the SP value of a plasticizer  $\tau_1$  less than 8.8 / a base resin  $\tau_2$  ], and there is a possibility that it may become impossible to completely effervesce in the foaming process or low temperature performance of a rubber compositum. When the molecular weight of a plasticizer exceeds 556, there is a possibility that it may become impossible to completely effervesce in the foaming process or low temperature performance of a rubber compositum from loss of the functionality of low temperature. Whereas a possibility that the addition of a plasticizer may become insufficient [ the addition effectiveness ] for there to be under 15 weight portions and the addition of a plasticizer exceeds 23 weight portions, while we will be anxious about the bad influence to the tool implementability of a rubber compositum, there is a possibility of causing the bonding failure of the bonding of a composite.

[427] the properties and effectiveness of the 3rd invention. Like the 4th invention, when BP's value of 13 is greater or 1.0 or more, the molecular weight of (2) phenol-ether is 490 or less and the addition of 10 phenol-ether is 1.0. If weight ratio is no more greater 1.0 weight ratio, the phenol-ether-mixed operation and effectiveness of the 3rd invention can be realized successfully.

[0423] An operation and effectiveness of the 3rd invention] Like the 2nd invention, the solvent contained which uses the above-mentioned acrylic rubber as a base emulsion can prevent effectively foams, such as spum generating at the time of the oil supply based on characteristics of acidic functionality which measured the volume resistivity value when the good conductivity by it when composition of 0.1% of a sample been not so assumed considered as 108 or less ohm-cm. In addition, when the acrylic rubber which uses toley's alkoxyl alkyl acrylate as the base has the function for an electric resistance value to be emitted from the test. It has the advantage and that a ratio of the above volume resistivity values is 1:1.

1024) Moreover, when proper combinations of a plasticizer or C18-unsatellites at the range where degree of hardness (i.e. durometer type A) of 313 KGS/10 is a maximum constituent is 53–75 degrees, an antistatic agent having the modulus of the softest substrate for practical use can be accomplished.

<sup>14</sup> An estimate and effectiveness of the 100 provision. The number constitutes approximately the 1st

Integration - the fifth generation can also realize good nondirectivity, and shows still more enhanced understandability and robust resistance, while it is equipped with the behavior of the understanding best understandability and the commanding low temperature performance.

19002). Therefore, while using for a inner layer the microspheres have using (?) this rather convenient, a double layer base which used this rather crossflows for the outer layer and the inner layer through (?) applying 2 em layers, and (?) this rather convenient like the hub location, the double layer base which for the outer layer other performance rather ingredient which were excellent as conductability or some resistance, without trifling through a applying such layer can be considered. The base of a mesh only at the degree of freedom of ingredient selection in the above (?) may be demanded.

in 0.13

Implementation of the two inventions first, the patents or non-patents or both of the 1st inventors - the 1st inventors are implemented. When only letting "this invention" to follow, the 1st invention - the 1st inventors are not implemented.

[0013] [Reader continues] The rubber component comprising the insulation may be a base insulating rubber to which crosslinking of allyl acrylate, i.e. 1-15% of the weight of a CR, and the bridge component can consist of an insulating composition with carbon oil.

[0014] Although when it is necessary, it is for these to be no greater than 10% about the amount of insulating in the cross and acrylic rubber of a bridge forming part of insulating, and less is desired if desired that it will be about 10%, the epoxy bridge insulation and insulating usually used these acrylic rubber can be used equal to 10% of the weight preferably, for example. Moreover, in this case, about a vulcanizing agent, epoxy vulcanization, insulating vulcanization, peroxide vulcanization, etc., are possible, and a time needs to perform secondary vulcanization.

[0015] Although the case of allyl acrylate is not treated, large MMA or large EVA of the spin temperature performance insulating effectiveness to a rubber component, and diverse MMA, are desirable. Moreover, like 1 in the case of using MMA and EVA, equivalent to the total quantity may become up to 10-15% of the weight, for example, 1, and in most cases of allyl acrylate can also be used up to that the total quantity may become 10-10-15% of the weight. As long as the above-mentioned insulating component generation is high in insulating, insulating composition use of the rubber base insulating of other types may be carried out.

[0016] It is desirable that 1-10 weight portion addition of the plasticizer whose  $T_g$  value is 8.8 or more, and whose molecular weight is 150 or less is carried out to the base material 10 weight portion into the bid insulating in the rubber component which uses the above-mentioned acrylic rubber as a base material. It is especially preferable that this 1-10 weight portion about the addition of a plasticizer that it is 10% or less above the molecular weight of a plasticizer that it is 9.0 or more about  $T_g$  value of a plasticizer to the base material 10 weight portion.

[0017] As a plasticizer used suitable, although other ester system plasticizer, such as "ADENKA user 88-107 (trade name)" by the Adenka chemical company and "ADENKA user KF-106 (trade name)" etc., can be mentioned, for example, as long as it corresponds to the above-mentioned conditions, it is not limited to these.

[0018] It is desirable to make the rubber insulating value from 10% or less when, and/or to, make the degree of hardness [the durometer type A of JIS K 6233] of rubber insulating use the range of 35-70 degrees by balance with addition of said plasticizer by blending CR with this rubber component partly, or the other hand. Although the hardness of CR cannot be uniformly specified that they change due to presence or absence with the addition of a plasticizer, the case of CR to be used, they can be made into 20-100 weight portion about the base material 10 weight portion as an example. Although there is no special limitation in the case of CR, it is necessary to balance many of other physical properties in the range which does not affect the rubber insulation effectiveness of this base material. Moreover, if required, combination of plastic insulator agents other than CR which does not reduce insulating, it is also possible.

[0019] Various well-known aditives, such as a vulcanizing agent, a vulcanization accelerators, a white filling agent, and an antioxidant, can be blended with a rubber component besides the above. Though it does not add or generally adds to consideration of the effect on fuel insulatingability, a low temperature performance, conductivity, etc. which is not desirable, as for white filling agents, such as a silica and a carbon, respectively, it is desirable to carry out to 10 weight portion extant to the base material 100 weight portion.

[0020] The above-mentioned rubber composition with a property suitable as fuel base from base material with the above-mentioned fuel insulatingability, and carbon, propellants, conductivity, etc. which is also fuel insulating, conductivity, and a property suitable as fuel base from base material, referred herein as insulating. The [insulating fuel transportation base] represents a fuel transportation base which can be used as a component of the part of the insulation of the insulating fuel transportation base of a insulating or insulating base insulating can be considered as various configurations like (7)-<sup>99</sup> of the like up, outside or outside. Moreover, the other component of insulation can be further added to the base or these configurations. It is desirable to be constituted with the rubber component which does not have material at least acrylic rubber which are equivalent base of a base requires for base insulation.

in these cases

[0043] The above [7] in the case of configurations of 1-190, the cases of spacing part of the configuration formulae or a splitting part need, in the case of forming a surface vinyl layer (maximum of the total volume of a single volume, a monolayer, or a double layer and a triadlic rubber layer) for 2 years and marked advantage, as "other predetermined rubber ingredients" are in "methacrylate or acrylate resins" in [8], the blend rubber (MR) of epichlorohydrin rubber (ECR), chlorosulfonated polyethylene rubber (CSM), acrylonitrile-butadiene rubber / vinyl chloride blend rubber (VCR), acrylonitrile-butadiene rubber, and ethylene-propylene-diene copolymer rubber of 3 years can be mentioned.

[0044] Although it can set up stability after the thick configuration of the lower layer of a base, and an outer layer corresponding to the total thickness of a base, the level of fuel impermeability needed, and many engine performances of others of a base, the outer layers must preferably be 1/1 or more thinner of the base tend thickness.

[0045] In manufacture of an automotive fuel transportation base, the most effective-modifying method and the injection lubricating oil is available. Moreover, there is an advantage is stated in as that the rubber containing comprising this amount is equipped with sufficient impermeability permeability to fatigue rubber, and it can perform the so-called pan brittle attack of a so-called core of a fuel hose of a major disaster.

[0046] Although the automotive fuel transportation base containing the oil mentioned can be used for the various applications as a fuel base without limitation, is especially suitable for the use as a filter such base, the resulting pipe base of a vapor line, or an evaporation base.

[0047]

[0047] Compiling (Computation formula of an unmodified rubber constituted) to undergo prepare the test piece for evaluation concerning each example of examples 1-7 and the example 1-10 of a comparison summarized in Table 1-3 of a test, respectively. The following table summarizes 2 where following each combination 1, NBR or SBR, and PVC where acrylic rubber or a polymer are polymers, and the following each combination 3 where ECR is a polymer are followed. And in the predetermined example shown to each table, the white hollow agent was blindfold and each combination formula of the combination comprising each example was set up.

[0048] 3-alkyl carboxylate 1 polymer 100 weight surfaces wherein said One weight portion 2-alkyl carboxylate wherein carbon block (CR) A various plasticizer (V) five processing oil One weight wherein vulcanizing agent various vulcanization said 2-alkyl carboxylate 1 is a thing applicable to examples 1-7 and the example 3-10 of a comparison. \*\*\* -- with the above-mentioned "polymer" While using the acrylic ester of the mass shown in the applicable column of each table, and so on, the acrylic rubber which is at the review of AICR showing no applicable ester is passed out.

[0049] Each combination 2 polymer A 100 weight surfaces nine epoxy five weight solutions styrene acid One weight surfaces as follows Two weight aqueous carbon block (CR) A various plasticizer Various sulfur 1/1 weight sections thioether systems vulcanization accelerating agent 1/5 weight sections anti-oxidant system vulcanization accelerators The 1/5 weight sections.

[0050] Thus base combination 2 corresponds to the example 2-4 of a comparison, and the above-mentioned "polymer" is ECR. When amount of AICR is 50 % of the weight, NBR and PVC which showed 20% of the weight of PVC in the example 3 of a comparison in NBR where amount of AICR is 40 % of the weight, and ECR-PVC which showed 10% of the weight of PVC to the amount 1 of a comparison to NBR where amount of AICR is 36 % of the weight as the example 3 of a comparison.

[0051] Each combination 3 polymer 100 weight surfaces magnesium oxide Three weight acetoacetic calcium hydroxide 5/4 weight calcium carbon block (CR) 15 weight sections.

[0052] The basic combination 3 corresponds to the example 1 of a comparison, and the above-mentioned "polymer" is "Dow 118553-Q (trade name)" by Sumitomo 33% which is the poly-1-vinylchloride copolymer (MMA) where Stomer content is 60%.

[0053] Note, although each table is explained collectively as a plasticizer -- example 1-3, 7, the examples 2 and 3 of a comparison, and 3- the "AICR-A 50 RS 107 (trade name)" by Asahi Glass

Kogure K. K. in 7 and 10 in the example 6, the "AIDENKA shear 205 (trade name)" by Asahi Denka Kogyo K. K. DGA was used for the example 8 of a copolymer for LDPE for the example 9 of a copolymer of the example 4 of a copolymer in the polyisobutylene (PIB) weight molecular weight polymer (PIB) which shows the "AIDENKA shear 305 (trade name)" by Asahi Denka Kogyo K. K. in a table, respectively. PI Pulin and molecular weight of these materials are also collectively shown in a table.

[0011] Next, in C8, the "isoprene 100 shear 130 (trade name)" by Shirei Carbon Corp. and that as "PIR" or "PIAP" according to the definition of the carbon grade of isoprene isoprene in the prior art which shows the "C 100 shear 130 (trade name)" by Toyo Carbide Co., but as "PIR" for "the C 100 shear 130 (trade name)" by Shirei Carbon Corp. Ltd. in a table, respectively.

[0012] Furthermore, as the example of a copolymer is shown in a table, it is shown Table as "table", Molar concentration of the above "the example 11 (CN vapor trade name)" was stated one.

[0013] Moreover, although the basic combination 1 - the basic combination 1 is explained below, the basic combination of the basic combination 1 is the "Tonic shear 400 (trade name)" made from Uniroyal Chemical Co. as an application of the basic combination 2, "OCTOPOL 20 (trade name)" or "the one for the RD (trade name)" by the Lubricant chemistry company. As a processing aid of the basic combination 1, "vulcanite toll 470 (trade name)" by the Enka petrochemical company. As a magnetite oxide of the basic combination 2, "Cas 2 (trade name)" by the Ochi chemistry company was used for "crosslinked NaAlO<sub>2</sub> 81.90 (trade name)" by the crosslinked chemistry company as a calcium hydroxide of the basic combination 3, respectively.

[0014] Furthermore, although the vulcanizing agent kind concerning the basic combination 1 is shown in Table 1 - 1, "Cle 70 (trade name)" by DENKI KAGAKU KOGYO K. K. whose "vulcanite" is an isoprene system vulcanizing agent or two, Relying upon "PAS shear 400 (trade name)" by the Ouchi Shikoku Chemicals Co. industrial company which is a vulcanization accelerator, or "EM-400L 10 (trade name)" by Kao-Chem. It shows "Tonicide" shows that the "polymer V-40 (trade name)" by Nippon Oil & Fats Co. Ltd. which is a peroxides system vulcanizing agent, or "the peroxides (trade name)" by the Lubricant chemistry company was used. As a sulfur system vulcanization accelerator agent concerning the basic combination 2, company "Nicalon C2 40 (trade name)" was used as a sulfuramide system vulcanization accelerator using Ouchi Shikoku Chemical "Nicalon" FF-G (trade name).

[0015] The rubber constituents which is not mentioned concerning each above-mentioned example is treated with a Banbury mixer and an opening roll as follows to the crosslinking formula concerning each example (Preparation of the test pieces for evaluation) these rubber constituents -- hot blast steam-treated for example 1 and the example 1 of a copolymer -- the pre-treatment for 100-degreeC, 1.43 minutes -- hot 100-degreeC oil bath of pre-treatment 100-degreeC 45 minutes. The examples 2-4 of a copolymer were fabricated with the pre-treatment for 100-degreeC 10 minutes in the shape of a sheet by the flattening of them, and the hot plate for evaluation of 130-degreeC of a sheet containing each example was prepared.

[0016] Evaluation of initial physical properties: the test pieces for evaluation containing each example -- using -- 118 K -- stretching to 425 and 4273, (MPa), elongation (%), and hardness (durometer type A) were evaluated in tensile strength, as initial physical properties. The result is shown in Table 1 - 3. About these initial physical properties, 10.0 or more MPa and elongation are considered that it is durable for surface (G1) is 50.70 for tensile strength 250% or more.

[0017] (Evaluation of grafting permeability) C1 using the so-called "I and C" gauze test using the test piece for evaluation as a grafting agent example -- the translucent cross-linked long-chain-2-hydroxy-1,3-butene and low-extensile grafting permeability. It is the approach that one side of a test piece is referred to as being enclosed in a gauze here by the "C1U methods" having a gauze on the surface of a permeable cup or apparatus, and sealing opening (openings are here) of a cup with the test piece for evaluation of the sample of a sheet of thickness 1.5 mm, and sealing the whole fixture do > wrapped (C1U) tightly in regular condition which had the 100-mg granule in the cup as permeation test diffusion measurement (one side) for 170 days is performed, and it is once 40 which gives 1.100ml/sec

gasoline 70° C° 100° C° ] and only 1 every 3 weight 100° C° about this gasoline (100%) is measured and placed. Next, 10-degree temperature [ 100° C° ] for 10 days is performed in this location, and it is every 100° C° every 100° C° weight 100° C° placed because this 100° C° is measured and save transmission coefficient is measured by the formula called transmission coefficient  $\eta = W_0 / W_1 \times 100\%$ . Although the measured transmission coefficient is shown in each table, it is thought that it is difficult to determine the transmission coefficient that is 100% or less.

[1005] (Evaluation of low-temperature performances) About the test piece for evaluation concerning each example shown in Table 1 - 2, it is 11%. By the cold shock endurance trial specified in K1001, low-temperature-cold-shock-test temperature (degree) was measured and the result was shown in Table 1 - 3. It is thought that it is difficult to low-temperature-cold-shock-test temperature that is below -10 degrees.

[1006] (Evaluation of volume resistivity) About the test piece for evaluation concerning each example shown in Table 1 - 2, it is 100. According to F-0011, the test method which set applied voltage in 1,100V measured the volume resistivity value (kilo-ohm), and the result was shown in Table 1 - 3 with it. It is thought that it is unique to a volume resistivity value that they are 100 or less, etc.

[1007] (Test tension endurance) About the test piece for evaluation concerning each example shown in Table 1 - 2, the elongation change after 120-degree temperature of Cu/Al8 copper (100% was measured), and the result was shown in Table 1 - 3. It is thought that it is difficult to an elongation change that it is less than -10%.

[1008] (Evaluation of fuel oil-penetration) About the test piece for evaluation concerning each example shown in Table 1 - 2, the volume change (%) after being immersed in the so-called "Fuel Oil" on the condition of 60-degree<sup>o</sup> 48 hours was measured, and the result was shown in Table 1 - 3. It is thought that it is difficult to a volume change that it is 30% or less.

[1009] (Evaluation of coal gas-proof nature) About the test piece after carrying out two-cycle combustion on the conditions of 40-degree<sup>o</sup> 70 hours of the above "Fuel Oil" which contains 2.2% of the weight of hard particles about the test piece for evaluation concerning each example shown in Table 1 - 2, it is evaluated whether there would be any abnormality, such as hardening and softening, and the result was shown in Table 1 - 3. That is, "O.K." was written when abnormally softening and "P.O." that "I" wrote together the records of the abnormality with abnormalities. The thing with abnormality being "with no abnormality" cannot be implemented.

[1010] (Evaluation of engine-pool corrosion) About the test piece after being immersed in the above "Fuel Oil" containing the diethyl-methylene derivative of 0.005 molar / L, at the condition of 60-degree<sup>o</sup> 22 hours about the test piece for evaluation concerning each example shown in Table 1 - 2, it is evaluated whether there would be any abnormality, such as hardening and softening, and the result was shown in Table 1 - 3. That is, "O.K." was written when abnormally softening and "P.O." that "I" wrote together the records of the abnormality with abnormalities. The thing with abnormality being "with no abnormality" cannot be implemented.

[1011] (Evaluation of engine loadability) About the test piece for evaluation concerning each example shown in Table 1 - 2. After performing performance referred to as presenting the vacuum driving of 40-degree<sup>o</sup> 1/48 hours after being immersed in "Fuel Oil" on the condition of 40-degree<sup>o</sup> 48 hours, that test piece in the condition of having made it elongate 40%, it was exposed in the test of the concentration of the excess of 40-degree<sup>o</sup> and 500 rpm for 100 hours, it is evaluated whether there would be any generating of a crack, and the result was shown in Table 1 - 3. That "O.K." was written shows that there was no generating of a crack, and, of course, this is 100% drivable.

[1012] (Other conditions) About the test piece for evaluation concerning each example shown in Table 1 - 2, the condition on the front face of a color after leaving it for one week in ordinary temperature was measured after color measurement, and the resistance of bending was investigated. That is, which the thing measured bending has "O.K." and bending was indicated in the table as "O.K."

[1013] However, it judged synthetically whether there would be any problem in workability by hardness and cold workability, and two factors: easier than the test piece for evaluation concerning each example shown in Table 1 - 2. That is, which color does not have a problem in workability too.

<sup>11</sup> See, for example, the discussion of the 1990s in the section on "The 1990s" in this article.

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CHAP. 21.]